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Scientific output on dyspepsia in internal medicine: a quantitative and visual bibliometric approach

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ABSTRACT

Aims: Dyspepsia is a prevalent and multifaceted gastrointestinal disorder that imposes a significant global health burden. Despite its widespread occurrence and complex clinical presentation, there has been no comprehensive bibliometric analysis addressing the scientific output on dyspepsia within the domain of general internal medicine. This study aims to quantitatively and visually evaluate global scientific trends, key contributors, thematic structures, and collaborative networks in dyspepsia research published under the category of internal medicine over the last two decades.

Methods: A total of 984 articles published between 2005 and 2024 were retrieved from the Web of Science Core Collection. Bibliometric indicators such as publication trends, top journals, highly cited articles, influential institutions, keyword co-occurrences, and collaboration patterns at the institutional and international levels were analyzed using VOSviewer and SPSS.

Results: The number of publications on dyspepsia has steadily increased, with the highest output observed in 2022. The most frequently used keywords included dyspepsia, *Helicobacter pylori*, and functional dyspepsia, which clustered with terms such as anxiety, depression, and endoscopy. Cureus Journal of Medical Science emerged as the top publishing journal, while the University of Bologna was the most cited institution. Collaboration network visualizations showed strong partnerships primarily among East Asian and North American institutions.

Conclusion: Dyspepsia research within internal medicine has gained momentum, especially in relation to functional dyspepsia and its psychosomatic dimensions. Despite the growing volume of publications, fragmentation across journals and disciplines remains. This study provides a strategic overview of the literature and highlights key areas for future research and policy development.

Keywords: Dyspepsia, functional dyspepsia, bibliometric analysis, internal medicine, *Helicobacter pylori*

INTRODUCTION

Dyspepsia is a common gastrointestinal disorder characterized by symptoms such as upper abdominal discomfort, bloating, early satiety, and epigastric pain, significantly affecting patients' quality of life and increasing healthcare costs globally.[1,2] While organic causes can sometimes be identified, the majority of cases fall under functional dyspepsia (FD), which is defined by the absence of detectable structural abnormalities. The pathophysiology of FD involves a complex interplay of factors such as altered gastric motility, visceral hypersensitivity, gut microbiota dysbiosis, and psychological comorbidities like anxiety and depression.[3,4] This multifactorial nature has made FD a subject of increasing research interest across various medical disciplines, including internal medicine, psychiatry, and gastroenterology.

In recent years, the scientific literature on dyspepsia has grown considerably, reflecting heightened academic and clinical interest in understanding its mechanisms and management strategies.[5,6] Bibliometric analysis has emerged as a valuable method to quantitatively assess research trends and developments within specific topics. Previous studies have explored selected aspects of FD, such as its association with mental health,[4] alternative treatments like acupuncture,[6] or broader motility disorders including gastroparesis.[7] However, there is currently no comprehensive bibliometric analysis that specifically examines dyspepsia-related publications within the field of internal medicine.

Given the ongoing global burden of dyspepsia, along with evolving clinical approaches to its diagnosis and treatment, identifying trends and gaps in the literature has become increasingly important. Despite rising research activity, no study to date has mapped the bibliometric landscape of dyspepsia within the general internal medicine literature. This study aims to fill that gap by analyzing key publication patterns, major contributors, and collaborative networks over the past two decades. The results are intended to inform

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clinicians, researchers, funding bodies, and journal editors by highlighting critical areas of focus and emerging themes.

Using data from the Web of Science Core Collection between January 1, 2005, and December 31, 2024, this bibliometric study focuses on dyspepsia publications classified under general internal medicine. It examines temporal publication trends, leading journals and institutions, prolific authors, citation metrics, keyword frequencies, and co-authorship networks. Ultimately, the study aims to evaluate how scientific interest in dyspepsia has evolved and to provide a clearer picture of its position within internal medicine research.

METHODS

Ethics

This study relies solely on open-access bibliometric information, thus ethical committee approval was not needed. Because there are no biomedical applications or direct interventions with human subjects, no ethical restrictions pertain to the research conducted.

Database and Scope

The primary source of this bibliometric study's data is the WoS Core Collection, which is a reputable academic database that consists of high-quality peer-reviewed scholarly publications. Due to its deep coverage and high reliability, this database is one of the first choices for bibliometric studies.

The analysis was restricted to publications that featured the word "dyspepsia" in their title, abstract, or keyword (the so-called "topic" filter) and within the "medicine general internal" category in WoS. This category was selected because it encompasses core clinical journals that publish research relevant to adult internal medicine, thereby providing a representative view of dyspepsia research from a generalist medical perspective. However, this focus may exclude relevant articles from subspecialties such as gastroenterology or psychiatry, and this limitation should be acknowledged. The timeframe for publication was set for between January 1, 2005, and December 31, 2024. Only records which were labeled "article" were included in the dataset. Reviews, editorials, conference papers, letters, and book chapters were excluded (Table 1).

Table 1. Data set construction and analysis process

Step	Description
1. Data collection	Data were retrieved from the Web of Science platform using the keyword 'dyspepsia' with the 'topic' filter applied.
2. Category selection	Only publications classified under the 'medicine general internal' category in the Web of Science Categories section were included.
3. Document type limitation	Only records categorised as "article" were selected for analysis.
4. Data analysis	A total of 984 articles were examined using the bibliographic analysis method.
5. Presentation of findings	The results of the analysis were presented in detail through tables and graphical illustrations.

Data Collection Process

Following the application of inclusion and exclusion criteria, a total of 984 articles were retained for final analysis. Completion of data collection was scheduled from January to March 2024. Initially, relevant articles underwent a review process wherein the titles, abstracts, and keywords of all retrieved articles were checked for relevance and duplicates were removed.

The following bibliometric data was carefully collected for each article:

- Title of the article
- Author(s)
- Article publication date
- Name of the journal
- Journal impact factor (if applicable)
- Citation count
- Affiliated institution(s) of the authors
- Corresponding author's country
- Keywords that seem to be used often

All data was checked and confirmed independently by two researchers. Any inconsistency was settled through discussions until a consensus was reached.

Survey Methodology

VOSviewer software (v. 1.6.11, Leiden University, The Netherlands) was used to conduct bibliometric analysis. For all visualizations, the layout algorithm was set to "LinLog/modularity", and "Association Strength" was selected as the normalization method. A minimum cluster size was determined automatically by the software. It creates and visualizes bibliometric networks which was the underlying focus of this study. Key areas of focus included:

- **Citations by year:** Analysis of the yearly frequency of published documents.
- **Journal mapping:** Determine which journals have published most articles on dyspepsia.
- **Citation analysis:** Study citation counts of the most popular authors, articles, institutions, and years of publications.
- **Keyword co-occurrence analysis:** Creation of visual representations of words along with other words from different contexts.
- **Research collaborations:** Showcase collaboration between different institutions on a single-research basis.
- **Country collaborations:** Study scientific collaborations with other countries.
- **Creator network analysis:** Analyze coauthorship to identify networks and graph the relationships between independant collaboratively involved writers.

For the purpose of term co-occurrence analysis, a minimum threshold of 5 occurrences per keyword was established. This

limit ensured that no conceptual patterns were ignored by focusing only on terms which were meaningfully used.

Statistical and Visual Analysis

Publication and citation metrics were summarized with descriptive statistics which included publication counts, journal distributions, and citations frequencies and percentages. Trends over time in scientific output were assessed with SPSS version 25.0 (IBM Corp.).

The following analytic and visual methods were employed:

- Annual publication trends were analyzed with line and bar graphs.
- Proportional tables were employed to represent journal and institutional output.
- Collaboration structures were illustrated with network maps generated using VOSviewer.
- Thematic or regional publication intensity were represented with density visualizations.
- Authors and keywords were grouped by thematic or regional proximity using clustering techniques.

The intensity of collaboration between the institutions and countries was illustrated by line thickness on the visual maps. In addition, cluster coefficients and link strengths were calculated to evaluate the cohesiveness and the density of research collaboration on the dyspepsia literature.

RESULTS

Analysis of Annual Publication Trends

Figure 1 illustrates the chronological distribution of studies included in the dataset retrieved from the Web of Science database.

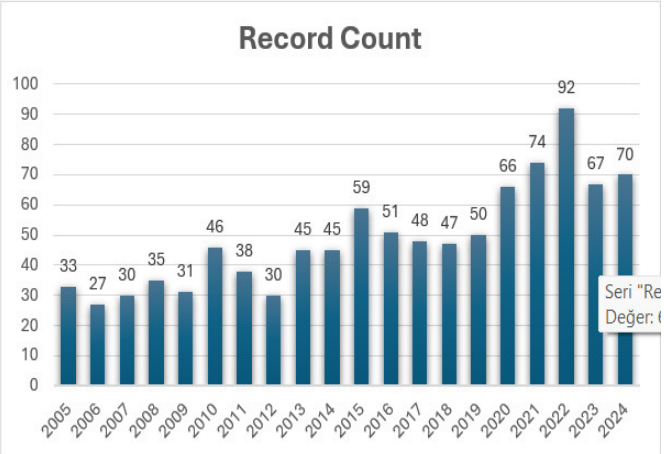

Figure 1. Annual distribution of articles

Figure 1 presents the annual distribution of articles published with the keyword "dyspepsia" between the years 2005 and 2024. The trend began in 2005 with 33 publications. Although fluctuations were observed in the initial years, an upward trend became evident starting from 2010. The number of publications reached 46 in 2010, increased to 59 in 2015, and reached 66 by 2020. The highest number of publications was recorded in 2022, with a total of 92 articles. This increase clearly reflects the growing academic interest in the topic of dyspepsia, particularly in the last decade.

In 2021, a total of 74 articles were published, followed by 67 in 2023 and 70 in 2024, indicating that research activities on the topic remain at a consistently high level. The overall increase in annual publication numbers underscores the rising medical and clinical significance of dyspepsia and suggests that the topic has secured a lasting position in the scientific literature.

Journals Contributing Most to the Field Literature

Based on data obtained from the Web of Science database, the distribution of journals that have published the highest number of articles on the topic of "dyspepsia" within the "medicine general internal" category is presented in Table 2.

Table 2. Journals of publication, number of articles, and proportional distributions

Publication titles	Record count	% of 959
Cureus Journal of Medical Science	69	7.01%
Medicine	44	4.47%
Journal of Clinical and Diagnostic Research	32	3.25%
Journal of Evolution of Medical and Dental Sciences Jemds	31	3.15%
Internal Medicine	27	2.74%
Terapevticheskii Arkhiv	25	2.54%
Journal of Clinical Medicine	22	2.24%
Bmj Open	19	1.93%
Current Medical Research and Opinion	14	1.42%
International Journal of Clinical Practice	14	1.42%
Others	687	69.82%

Table 2 presents the number and percentage distribution of 984 articles on "dyspepsia" published under the "medicine general internal" category. The journal with the highest number of publications is Cureus Journal of Medical Science, which accounts for 69 articles (7.01%). This is followed by Medicine (44 articles, 4.47%), Journal of Clinical and Diagnostic Research (32 articles, 3.25%), and Journal of Evolution of Medical and Dental Sciences *(JEMDS)* (31 articles, 3.15%). These four journals play a central role in the scientific dissemination of dyspepsia-related studies.

The top ten journals collectively published 297 articles, representing 30.18% of the entire dataset. The remaining 687 articles (69.82%) fall under the "others" category, indicating that they are distributed across a wide range of different journals. This distribution suggests that research on dyspepsia is not limited to a few core journals but is rather dispersed throughout a broad spectrum of academic publications. This variety reflects the interdisciplinary nature of the subject and its tendency to be addressed in diverse scholarly platforms.

Detailed Bibliometric Analysis of Highly Cited Publications: Authors, Titles, Journals, Years, and Citation Metrics

In the Web of Science database, the most highly cited studies related to the topic of "dyspepsia" within the "medicine

general internal" category are presented in detail in Table 3, including author information, journal names, publication years, and citation counts.

The data presented in Table 3 comprehensively highlights the most highly cited publications within the "medicine general internal" category on the topic of dyspepsia. According to the data, the most cited article is by Galiè et al. (2005), published in the New England Journal of Medicine, which focuses on sildenafil citrate therapy for pulmonary arterial hypertension and has received 1.849 citations. Although this study is not directly related to dyspepsia, it appears in the analysis due to category-based inclusion criteria and represents the top-cited publication within the selected scope.

The second most cited article is by Noble et al. (2011), published in The Lancet, which presents a randomized controlled trial on pirfenidone use in patients with idiopathic pulmonary fibrosis. This article has received 1.616 citations.

In third place is a study by McColl (2010), published in the New England Journal of Medicine, which directly addresses *Helicobacter pylori* infection. This article has garnered 565 citations and is considered a key reference in the literature regarding the etiology of dyspepsia.

The fourth article, authored by Simonneau et al. (2008), evaluates the addition of sildenafil to long-term intravenous epoprostenol therapy in patients with pulmonary arterial hypertension. Published in the Annals of Internal Medicine, it has received 510 citations.

Finally, in fifth place, Webster et al. (2005) published a meta-analysis comparing tacrolimus and ciclosporin as primary immunosuppression in kidney transplant recipients, in the British Medical Journal (BMJ). This study has accumulated 413 citations.

These findings demonstrate that while some of the most cited articles are not exclusively focused on dyspepsia, their inclusion within the "medicine general internal" category contributes to the broader scientific landscape in which dyspepsia research is situated.

Analytical Evaluation of Publications by Institutions with the Highest Citation Counts

In the Web of Science database, institutions affiliated with authors who published studies on "dyspepsia" within the "medicine general internal" category were analyzed in terms of the number of documents and the total citations received. This information is presented in detail in Table 4.

Table 4. Top cited institutions and distribution of their publications according to web of science data

Organization	Documents	Citations
University of Bologna	9	3101
The University of Sydney	5	804
The University of Adelaide	9	691
Mayo Clinic	8	506
Kawasaki Medical School	9	389

The data in Table 4 reveal the institutions that have made the most significant academic impact in the field of dyspepsia within the "medicine general internal" category, as measured by citation counts. The University of Bologna stands out as the top-performing institution, with 9 publications garnering a total of 3.101 citations, reflecting its substantial influence and leading contributions in dyspepsia research.

The University of Sydney ranks second with 5 publications and 804 citations, indicating that despite a lower publication count, its research output has had a high scientific impact. Similarly, The University of Adelaide has achieved 691 citations from 9 publications, reflecting a strong academic contribution.

Trends in Keyword Usage

The most frequently used keywords related to the topic of "dyspepsia" in the Web of Science database and their interrelationships are visualized in Figure 2.

The bibliometric analysis was conducted using VOSviewer software, and a minimum threshold of 5 occurrences was applied to the selection of keywords. This criterion ensured that only keywords appearing at least five times were included in the analysis, allowing the evaluation to focus on more meaningful, widely used, and representative terms.

Although a total of 2.103 unique keywords were identified, only 90 met the threshold for inclusion. This methodological approach indicates the study's focus on in-depth analysis of conceptual structures and relationships based on high-frequency terms.

Table 3. Author information, journal titles, publication years, and citation counts of the most cited articles on the topic of "dyspepsia"

No	Author(s)	Article title	Journal name	Year of publication	Number of citations
1	Galiè N, et al.	Sildenafil citrate therapy for pulmonary arterial hypertension	New England Journal of Medicine	2005	1849
2	Noble PW, et al.	Pirfenidone in patients with idiopathic pulmonary fibrosis (CAPACITY): two randomised trials	Lancet	2011	1616
3	McColl KEL.	*Helicobacter pylori* Infection	New England Journal of Medicine	2010	565
4	Simonneau G, et al.	Addition of sildenafil to long-term intravenous epoprostenol therapy in patients with pulmonary arterial hypertension a randomized trial	Annals of Internal Medicine	2008	510
5	Webster AC et al.	Tacrolimus versus ciclosporin as primary immunosuppression for kidney transplant recipients: meta-analysis and meta-regression of randomised trial data	Bmj-British Medical Journal	2005	413

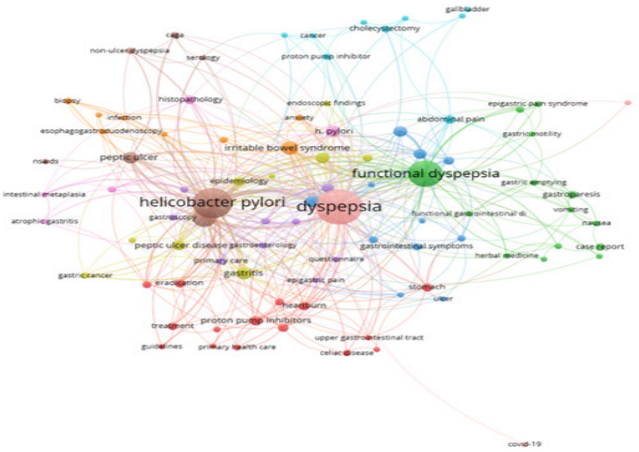

Figure 2. Co-occurring keywords and their usage frequencies

The analysis revealed the most frequently used keywords and the strongest relational ties among them. In total, 460 keyword connections were identified, and the keywords were grouped into 10 distinct clusters. These findings help map terminological patterns and conceptual proximities in the field and contribute to identifying key concepts for future research.

Figure 2 visualizes the most frequently used keywords in academic publications on dyspepsia within the "Medicine General Internal" category and the relationships among these terms. This analysis highlights conceptual focal points in the dyspepsia literature and illustrates the main thematic concentrations.

According to the data, the most frequently used keyword is "dyspepsia", with a total of 213 occurrences. This indicates that the topic of focus holds a central position in the literature and is widely examined. The second most frequent term is "*Helicobacter pylori*" with 154 occurrences, reflecting its role as one of the most common etiological factors in dyspepsia. This relationship emphasizes the microbiological dimension of the disorder.

"FD", with 116 occurrences, ranks third and indicates the prominence of studies addressing dyspepsia cases without identifiable organic causes. This term has gained increasing attention in recent years due to the growth in functional gastroenterological research.

Other less frequent but clinically significant keywords include "endoscopy" (54 times), "peptic ulcer" (23 times), and "gastritis" (27 times). These concepts represent diagnostic methods and comorbid conditions commonly evaluated alongside dyspepsia. Endoscopy, in particular, stands out as a fundamental diagnostic tool in differentiating dyspepsia, while peptic ulcer and gastritis are often considered concurrent pathologies.

In general, the results of the keyword analysis suggest that publications on dyspepsia focus predominantly on diagnosis, etiology, and clinical subtypes. The frequency of keyword usage serves as an important indicator of both current trends in the literature and priority concepts for future investigations.

Institutional-Level Academic Collaboration: Analytical Evaluation

The structure of scientific collaboration among institutions affiliated with researchers publishing on dyspepsia has been examined in detail. The density and network of inter-institutional partnerships reflect the academic interaction at the organizational level. The results of this analysis are visualized in Figure 3.

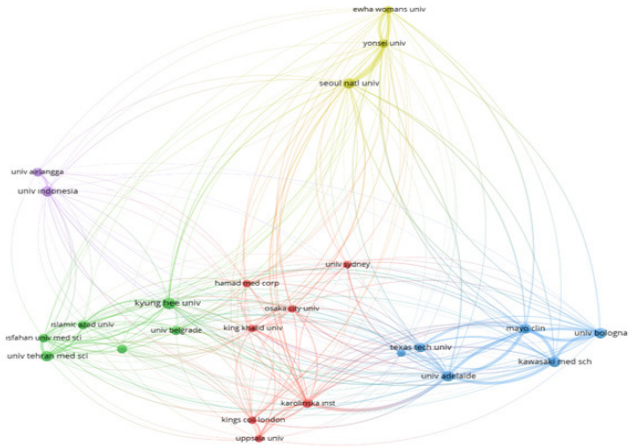

Figure 3. Bibliometric network visualization of inter-institutional collaborations

The collaboration analysis was conducted using VOSviewer software. In the resulting map, different colors represent institutions grouped by thematic proximity or geographical clustering. The lines connecting institutions indicate academic collaborations, and the thickness of the lines reflects the intensity and continuity of these interactions. This visualization helps uncover the institutional distribution of dyspepsia-related academic output and offers strategic insight for identifying existing strong partnerships and potential future collaborations.

The analysis shows that institutional collaborations in dyspepsia research are particularly concentrated among a few universities. Notably, Seoul National University and Karolinska Institutet stand out with 23 connections each. This highlights their central role in both scientific productivity and international cooperation in dyspepsia studies.

Mayo Clinic and The University of Sydney also demonstrate strong academic networks, each with 22 connections, indicating their active participation in multicenter studies. Additionally, Texas Tech University and Kyung Hee University, each with 21 connections, are also among the prominent institutions with high collaborative capacity both regionally and globally.

Overall, the findings indicate that scientific output on dyspepsia is not limited to individual researchers but is often based on robust institutional networks. These analyses make the structural characteristics of current collaborations visible and provide strategic data for developing new research partnerships.

Researcher-Level Academic Collaboration Analysis

Based on publications retrieved from the Web of Science, collaborative networks among researchers working in the field of dyspepsia were analyzed in detail. The results reveal the intensity, structure, and clustering patterns of academic interactions between authors and provide key insights into how much scientific production is based on collaboration. The results are visualized in Figure 4.

Figure 4. Collaboration map showing academic partnerships (larger circles represent prominent researchers, while lines indicate co-authored studies.)

Figure 4 visualizes bibliographic connections among researchers who have published at least five articles on dyspepsia. Although a total of 5,053 authors were evaluated, only 11 authors met the inclusion threshold and were included in the analysis. This threshold ensures the inclusion of researchers who have made significant academic contributions, thereby increasing the reliability and scientific value of the findings.

Each researcher is represented as a circle in the map. The size of the circle indicates the author's contribution to the literature, and the lines between circles represent co-authorship and collaborative efforts. Clusters are distinguished by color and represent researcher groups formed based on thematic or geographical proximity.

In the red cluster, Ha, Nayoon and Kim, Jisung are notable for their central positions and multiple connections. These two authors have established strong collaborative ties, particularly in Asia-centered dyspepsia research. Miwa, Hiroto and Haruma, Ken, who are also part of this cluster, play key roles in both intra- and inter-cluster collaborations. Ahmet Cumhur Dülger is also part of this group and displays an internationally collaborative profile.

In the green cluster, Watanabe, Toshio stands out as the most connected author. Alongside Fujiwara, Yasuhiro, Tanigawa, Tetsuya, and Tominaga, Kazunari, this group forms a strong thematic network, particularly in Japan-based studies. Their close collaboration and high output make this cluster a prominent example of regional academic synergy.

Country-Level Citation Distribution

Citations to publications on dyspepsia were analyzed on a country-by-country basis using data from the Web of Science database. This analysis highlights how citation distributions vary at national and regional levels and reveals the intensity of academic collaboration between countries. The findings identify the countries that shape the global literature on dyspepsia and are visualized in Figure 5.

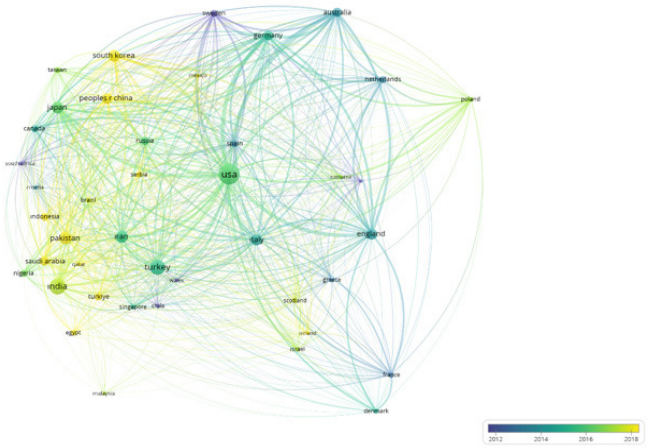

Figure 5. Visualization of the geographic distribution of academic citations by country

Figure 5 presents a detailed visualization of the geographical distribution of citations and inter-country academic collaboration structures based on publications in the Web of Science (WoS). Only countries with at least five publications were included in the analysis. Out of 89 countries, 42 met the inclusion criteria. These countries were grouped into five clusters, based on similar research trends or collaborative networks.

This mapping contributes to understanding global research dynamics and provides a valuable foundation for assessing international research contributions and trends in dyspepsia literature.

The connections between countries represent academic collaborations, with line thickness indicating the strength of partnerships. The size of each country's node reflects its level of contribution to the literature. A color scale indicates the temporal distribution of publication activity, highlighting the evolution of research trends over time.

The United States appears as the central node and the most significant contributor to dyspepsia literature, with the broadest international collaboration network. The U.S. has particularly strong ties with countries such as the United Kingdom, China, Germany, Italy, Canada, Japan, and France, reflecting its global leadership in the field.

Among European countries, Germany, the United Kingdom, France, Italy, Spain, and the Netherlands are notable for both high citation counts and dense inter-country collaborations, forming a robust Europe-centered academic network.

In Asia, China, India, Japan, and South Korea stand out. China, with strong connections to the U.S., plays a significant role in the global research network. Japan, with well-balanced collaborations with both American and European countries, demonstrates its strong presence in the international research arena. India and South Korea also contribute significantly through both regional and global partnerships.

Turkiye, with a moderate number of collaborations, acts as a regional bridge, particularly through its academic relationships with Iran, Pakistan, and European countries. Canada, Australia, and Brazil have also established distinct regional collaboration networks and maintain strong ties with major contributors like the United States.

Countries with more limited but focused collaborations include Sweden, Switzerland, Greece, Israel, and Denmark, contributing to the literature through specialized thematic partnerships.

Mayo Clinic, with 8 publications and 506 citations, ranks fourth, followed by Kawasaki Medical School, which published 9 articles and received 389 citations, placing it in fifth position. These institutions have clearly served as key centers of knowledge production in the field of dyspepsia.

Overall, the findings indicate that the most highly cited institutions are primarily medical schools and clinically focused research universities. This suggests that dyspepsia is being addressed both theoretically and clinically, and that research activities in this field are strongly supported at the institutional level. Additionally, the observation that some institutions achieve high citation counts with relatively few publications highlights the importance of research quality and scientific impact over sheer publication volume.

DISCUSSION

This bibliometric analysis shows that the number of publications related to dyspepsia in the internal medicine field has steadily and sharply increased over the last twenty years. This increase is in the annual publication numbers is in line with Wang et al.'s[5] findings, which indicated a rising global research focus on FD. Their analysis of the literature from 2001 to 2021 identified a shift in 2010 in the growth rate of literature on FD, mainly driven by the growing fascination with the gut-brain axis and psychosomatic approaches. Our keyword co-occurrence analysis supports this finding. In our analysis, the highest number of publications was recorded in 2022 and remained at a high level in the following years of 2023–2024, illustrating sustained momentum in scholarly activity. Huang et al.[4] further noted the growing focus of publications integrating the psychiatric angle of anxiety and depression alongside FD. We also found that those keywords, alongside 'anxiety' and 'depression', with 'FD', were tightly clustered in the VOSviewer co-occurrence map, indicating that these fields of research are increasingly collaborating across disciplines, suggesting the emergence of a research theme that combines gastroenterology and psychiatry.

The thematic distribution of journals identified in the data set follows trends established in previous bibliometric studies. Wang et al.[5] identified Neurogastroenterology & Motility and World Journal of Gastroenterology as FD focus area leaders, but we found that Cureus, Medicine, and the Journal of Clinical and Diagnostic Research had the highest publication counts under the general internal medicine category. This difference may indicate that our analysis, which takes a generalist approach to medicine rather than a gastroenterology-focused approach, is more diffuse and less specialized. Nevertheless, the two studies' findings regarding the preeminent clinically relevant, open-access publishing avenues suggest that researchers tend to prefer such venues for dissemination when working on dyspepsia because it is a significant public health issue.

For dyspepsia, citation analysis brought to light articles that were peripheral to the topic, but fell within the same WoS category. This partly reflects the challenge faced in Wei et al.,[6] where bibliometric studies on acupuncture and FD had to be purged of broad Chinese medicine publications not focused on the condition. Most importantly, the other McColl[11] and Ford et al.[8,9] Overlapping roles and risks focuses on IBS-dyspepsia were among the most cited works in our dataset. It remains important that the shared, multi-cited patho-physiological interest in gastrointestinal diseases is relevant. Ford et al.[8] showed that as many as 30% of patients with dyspepsia meet the IBS criteria which accounts for the prevalent co-occurrence of keywords like "IBS", "functional bowel disorders" and "visceral hyper-sensitivity" that we found in the network visualization of our study. In addition, some of the keywords used included "post infection", "motility", and "GI inflammation" which, together with Futagami et al.[10] meta-analysis on post-infectious FD, illustrate the cluster analysis results interlinked with dyspepsia, inflection, and systemic triggers—incorporated these connections indirectly evidenced through the clustering results.

Based on national and institutional collaboration, our research highlights Japan, South Korea, China, and the United States as the forefront participants. This was already documented by Huang et al.[4] and Li et al.[7] in their analyses of FD and gastroparesis. While primarily focusing on North America's research dominance, Li et al.[7] also noted Eastern Asian institutions' increasing contributions to pathophysiology research. In the case of motility disorder research as well as in our collaboration network maps, there are notable hubs of activity around Seoul National University and Mayo Clinic and Kyung Hee University: a further testament to the East–West academic partnership in dyspepsia research. Wei et al.[3] remarked on the Chinese and Korean contribution to acupuncture-based FD studies which coincide with the presence of complementary medicine clusters from our co-occurrence analysis.

Most strikingly, our observation that more than two-thirds of articles were dispersed over numerous journals aligns with earlier bibliometric notes on fragmentation in functional GI literature.[4,5] This scattering could illustrate the interdisciplinary aspect of dyspepsia but it also indicates a need for greater consolidation and collaboration across disciplines. In the keyword clustering performed in our work, besides capturing dominant terms like 'FD' and '*Helicobacter pylori*', 'gastritis', and 'endoscopy', there was also capture of pioneering

terms such as microbiome, low-grade inflammation, and psychosocial stress in line with newer mechanistic theories in FD pathophysiology. Focusing on these themes and fostering international academic collaborations aimed at developing stronger multicenter resources could shift future research agendas towards these issues.

CONCLUSION

This investigation offers a dyspepsia research evaluation within internal medicine on the bases of publications over the past 20 years. Its bibliometric review shows an interdisciplinary focus surge alongside an overarching increase in publication output. Keywords such as FD, *Helicobacter pylori*, and comorbid psychological disorders underline the developing viewpoint that dyspepsia is a multifaceted disorder with biological and psychosocial dimensions. Unlike previous studies that focused on ancillary issues like acupuncture or anxiety, this study provides a more comprehensive assessment of scientific output by mapping major scientific centers, their productive institutions, prominent journals, and international collaboration patterns demonstrating the scope of cooperation across borders. Although there is increased output, it remains scattered and fragmented across numerous journals and geographic locations and does not consolidate around a few high-impact multicenter studies, which slows advancement. These results offer a starting point for strategic research planning important for clinicians and policy strategists aimed towards more effective dyspepsia management, ultimately enabling advanced understanding of the disease.

ETHICAL DECLARATIONS

Ethics Committee Approval

Since this research is a bibliometric study, it did not require ethics committee approval.

Informed Consent

Since this research is a bibliometric study, it did not require informed consent.

Referee Evaluation Process

Externally peer-reviewed.

Conflict of Interest Statement

The authors have no conflicts of interest to declare. T he authors declared that this study has received no financial support.

Author Contributions

All of the authors declare that they have all participated in the design, execution, and analysis of the paper, and that they have approved the final version.

REFERENCES

1. Bytzer P, Talley NJ. Dyspepsia. *Ann Intern Med*. 2001;134(9_Part_2):815-822. doi:10.7326/0003-4819-134-9_part_2-200105011-00004
2. Ford AC, Mahadeva S, Carbone MF, Lacy BE, Talley NJ. Functional dyspepsia. *Lancet*. 2020;396(10263):1689-1702. doi:10.1016/S0140-6736(20)30469-4
3. Talley NJ, Cook DR. Functional dyspepsia. In: Essential medical disorders of the stomach and small intestine: a clinical casebook. Springer; 2019.
4. Huang Q, Yuan H, Li Q, et al. Global trends in research related to functional dyspepsia and anxiety or depression over the past two decades: a bibliometric analysis. *Front Neurosci*. 2023;17:1218001. doi:10.3389/fnins.2023.1218001
5. Wang X, Liu H, Li W, Xiao H. Bibliometric analysis of functional dyspepsia research trends over the past 20 years. *Front Public Health*. 2022;10:1019110. doi:10.3389/fpubh.2022.1019110
6. Wei X, Jia X, Su X. Evidence-based bibliometric analysis of acupuncture in functional dyspepsia: clinical efficacy and research trends. *J Multidiscip Healthc*. 2025;18:2141-2153. doi:10.2147/JMDH.S515144
7. Li M, Gao N, Wang S, Guo Y, Liu Z. A global bibliometric and visualized analysis of the status and trends of gastroparesis research. *Eur J Med Res*. 2023;28(1):543. doi:10.1186/s40001-023-01537-1
8. Ford AC, Marwaha A, Lim A, Moayyedi P. Systematic review and meta-analysis of the prevalence of irritable bowel syndrome in individuals with dyspepsia. *Clin Gastroenterol Hepatol*. 2010;8(5):401-409. doi:10.1016/j.cgh.2009.07.020
9. Ford AC, Marwaha A, Sood R, Moayyedi P. Global prevalence of, and risk factors for, uninvestigated dyspepsia: a meta-analysis. *Gut*. 2015;64(7):1049-1057. doi:10.1136/gutjnl-2014-307843
10. Futagami S, Itoh T, Sakamoto C. Systematic review with meta-analysis: post-infectious functional dyspepsia. *Aliment Pharmacol Ther*. 2015;41(2):177-188. doi:10.1111/apt.13006
11. McColl KEL. *Helicobacter pylori* infection. *N Engl J Med*. 2010;362(17):1597-1604. doi:10.1056/NEJMcp1001110